2022

COMPUTER SCIENCE

(Theory)

Full Marks : 70

Pass Marks : 21

Time : Three hours

All the questions are compulsory.

The figures in the right margin indicate full marks for the questions.

Select the correct answer from each of the following and rewrite it.

1. The Structure tag can be omitted when   1

   A. Two structure variables are needed

   B. Only one structure variable is needed

   C. Three structure variables are needed

   D. No structure variable is needed

2. The output of the following program segment is :   1

   int list[5] = {2,5,6,0,9};

   list[3] = list [4]+6;

   cout<<*(list+3);

   A. 15

   B. 6

   C. 12

   D. 11

3. In which of the following data models can a child record have many parent records?

    A. Hierarchical model

    B. Relational model

    C. Network model

    D. Object based model

    1

4. The dual of $(a+b'+c)(a+b)$ is

    1

    A. $(ab'c)+(ab)$

    B. $(a'bc')+(a'b')$

    C. $(ab'c')+(a'b)$

    D. $(abc)+(ab)$

5. Which protocol is used to copy a file from / to a remotely located server ? 1

    A. HTTP

    B. TCP/IP

    C. NNTP

    D. FTP

Give very short answer of the following questions :

6. What is reference variable ?

    1

7. What is the key to reusability in OOP ?

    1

8. How are the object's behavior and object's characteristics represented in OOP ?

    1

9. Why do we need data structures ?

    1

10. How do you find the address of an element in one dimensional array ? 1

11. What are the two fields of a linked list node ?

    1

12. State the Involution Theorem of Boolean Algebra.

    1

13. Why do we use Karnaugh Maps in solving Boolean Expression ? 1

14. An IT company wants to form a network on their five computers to a server within the company premises. Represent star topologies diagrammatically for this network.

    1

15. What term we use for a software/hardware device, which is used to block, unauthorized access while permitting authorized communications? 1

Give short answer of the following questions :

16. Write a structure definition statement to hold employee related information such as Emp_no, name, basic_ pay and gross_salary. The definition should also declare two variables, manager and accountant both of the same type. 2

17. Write the General form of a class declaration. 2

18. Write a C++ program to print the characters of string on different lines using pointer. 2

19. Write the User defined function in C++ to delete an element from a queue. 2

20. Consider the sorted list = 2, 5, 8, 16, 20, 24, 36, 42. Manually search for the value 24 using binary search method. 2

21. How is a tuple different from an attribute in a relation ? 2

Give answer of the following questions :

22. Observe the following table carefully and write the names of the most appropriate columns, which can be considered as i) primary keys and ii) candidate key. 2

Part_no.	Part_name	Size	Qty
p1	Xyz	13×11	1000
p2	abc	10×10	2000
p3	pqr	6×6	300
p4	uvw	7×9	500

23. Draw a circuit diagram to realize the following expression :

$F(A, B, C) = (A' + B)(B + C')$ making use of NOR gate only. 2

24. Verify $A.B'C + AB'C' + A'B'C = AB' + B'C$ algebraically. 2

25. Compare coaxial and optical fibre. 2

26. Define OOP. Write any two major advantages of OOP. 3

Give answer of the following questions :

27. How does a class support data-hiding, data abstraction and encapsulation ? 3

28. Evaluate the following postfix notation of expression using a stack and show the contents of stack after execution of each operation :

    15, 50, + , 20, 5, –, * 3

29. Design and implement Half Adder Circuit. 3

30. Define the following : 3

    A. Cyber crime

    B. E-mail

    C. Video conferencing

Give answer of the following questions :

31. Define a constructor. When is constructor invoked ? State three different forms of constructor. 5

32. Create two classes MC and FI, which store the values of distances. MC stores distances in metres and centimeters whereas FI stores distances in feet and inches. Write a C++ program that reads values for the objects of both the classes and adds one object of MC with an object of FI. 5

33. Write a C++ program to sort a list of elements in ascending order using insertion sort method. 5

34. (a) Differentiate between drop table commands and delete command.

    (b) Why distinct clause is used with select command ?

    (c) Consider a table STUDENT having fields Roll, Class, Name, Game, GameGrade, SUPW, SUPWGrade. Write the SQL commands :

    i) Display the different Games offered in the school.

    ii) Add a new Column named "Marks".

    iii) Arrange the whole table in the alphabetical order to SUPW. 5